

# Work Order ID 51480

August 25, 2009 1:05:16 PM



Page 1

Item ID: D412-664-203TRN

Accept



Setup Start



Revision ID: D

Stop



Item Name: Crosstube Turning Detail

Start Date: 8/26/09 Start Qty: 1.00



Cust Item ID:

Required Date: 9/09/09 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

*PS*

Date:

09-8-25

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D412-664-243

Rev D

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA166  
2-Turn first side as per Folio FA166 3- File transition lines smooth.

*0.00 09 - 09 - 02 0*

110

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

*0.00 09 - 09 - 02 0*

120

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA166 2- File transition lines smooth. 3-  
Remove sand and plugs 4-Scribe part # and batch # using vibrating stilus

*0.00 09 - 09 - 02 0*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 51480

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Page 2

Item ID: D412-664-203TRN

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Item Name: Crosstube Turning Detail

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Cust Item ID:

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Customer:

Reference:

Run Start



Approvals: Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

G.M 09 - 02 - 020

140

QC8- Inspect parts - second check

0.00



QC

Memo

0.00

Quality Control

1 Ø - AWM992

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1 Ø - AWM992

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 51480**

August 25, 2009 1:05:16 PM

Page 3

Item ID: D412-664-203TRN

Accept

Revision ID: D

Item Name: Crosstube Turning Detail

Start Date: 8/26/09 Start Qty: 1.00

Required Date: 9/09/09 Req'd Qty: 1.00

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

Q.M 09-09-020

170

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack. Location: X-TUBE CELL

1 9 - AWM9-2-2

180

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

09/09/03 HJ

u 92.8.03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Page 1

August 25, 2009 1:05:15 PM

Work Order ID: 51480

Parent Item: D412-664-203TRNRevD

Parent Item Name: Crosstube Turning Detail

Comments:

Start Date: 8/26/09

Required Date: 9/09/09

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D6009-129RevA		Manufactured	No			120	Each	14.5000	1.0000			



Crosstube Material



09.09.02

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
LG	14.5	
34691	-2.5	
38342	17	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 51480
<b>Description:</b> Crosstube Assembly (412 High Aft)	<b>Part Number:</b> D412-664-243
<b>Inspection Dwg:</b> D412-664-243 <b>Rev:</b> D	<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.689	/			
	2.748	+0.005/-0.000	2.750	/			
	2.884	+0.005/-0.000	2.889	/			
	3.019	+0.005/-0.000	3.023	/			
	3.163	+0.005/-0.000	3.165	/			
	3.308	+0.005/-0.000	3.313	/			
	3.429	+0.005/-0.000	3.432	/			
	2.990	+0.005/-0.000	2.992	/			
	2.618	+0.005/-0.000	2.621	/			
	0.200	+/-0.010	0.200	/			
	R0.063	+/-0.010	R0.068	/			
	R0.500	+/-0.010	R0.500	/			
	4.971	+/-0.030	4.971	/			
SIDE B	2.684	+0.005/-0.000	2.689	/			
	2.748	+0.005/-0.000	2.750	/			
	2.884	+0.005/-0.000	2.889	/			
	3.019	+0.005/-0.000	3.021	/			
	3.163	+0.005/-0.000	3.166	/			
	3.308	+0.005/-0.000	3.318	/			
	3.429	+0.005/-0.000	3.432	/			
	2.990	+0.005/-0.000	2.993	/			
	2.618	+0.005/-0.000	2.621	/			
	0.200	+/-0.010	0.200	/			
	R0.063	+/-0.010	R0.068	/			
	R0.500	+/-0.010	R0.500	/			
	4.971	+/-0.030	4.971	/			
	124.09	+/-0.020	124.090	/			

<b>Measured by:</b> Q.m	<b>Audited by:</b> AVM	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 09.01.02	<b>Date:</b> 9-2-2	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	04.06.16	New Issue (P/O D412-664-203)	KJ/JLM	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	07.05.08	Tolerance updated for dimension 4.971	KJ/JLM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DART**

DESIGN <b>PH</b>	DRAWN BY <b>PH</b>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <b>GP</b>	APPROVED <b>PH</b>	DRAWING NO. D412-664-243	REV. D SHEET 1 OF 3
DATE 07.03.09		TITLE CROSSTUBE ASSEMBLY (412 HI AFT) NTS	
A	01.10.17	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	06.10.27	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398 MS21920-32 WAS MS21920-30	
D	07.03.09	REMOVE D2732-058, CHANGE TO D3595-063-570	

**RELEASE**

07.04.24

Qty	Part Number	Description
X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
1	D6009-129	CROSSTUBE
2	D3595-063-570	RUBBER CUSHION
1	D2896-1	SUPPORT
2	D2856-600-1009	ABRASION STRIP
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
2	D3189-1	CHAFING SHIELD
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

8715

**GENERAL NOTES:**

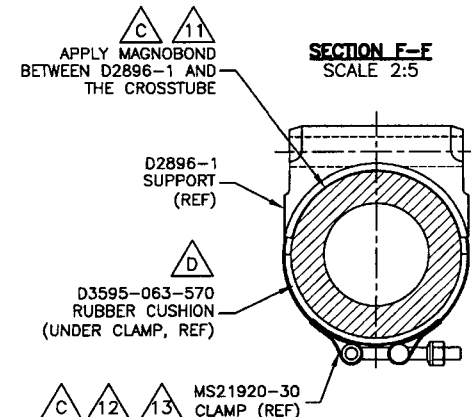
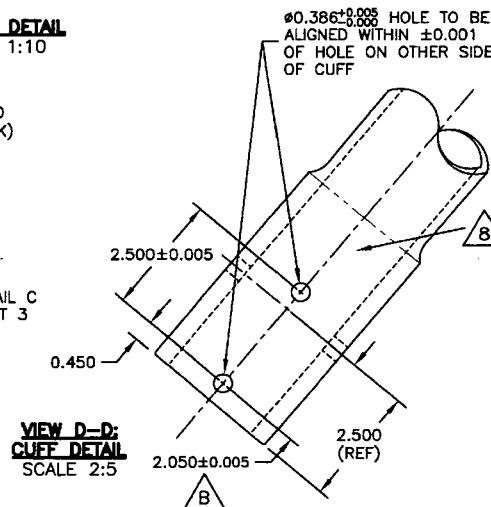
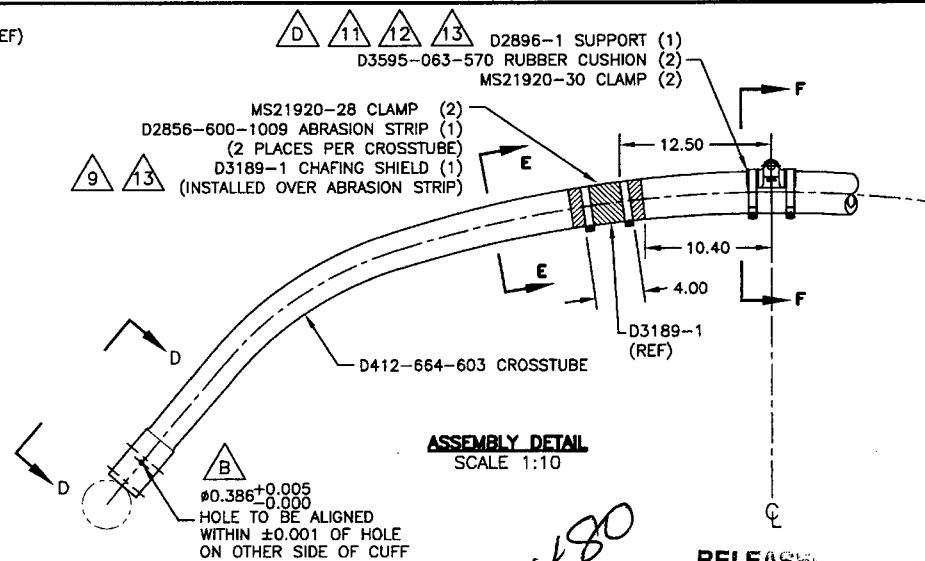
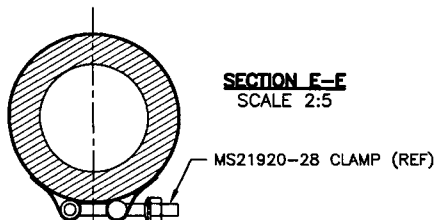
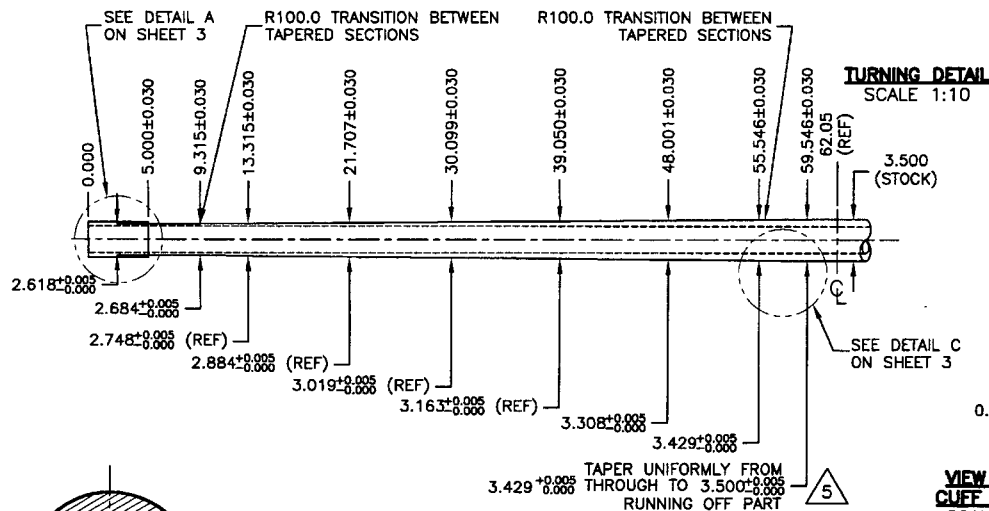
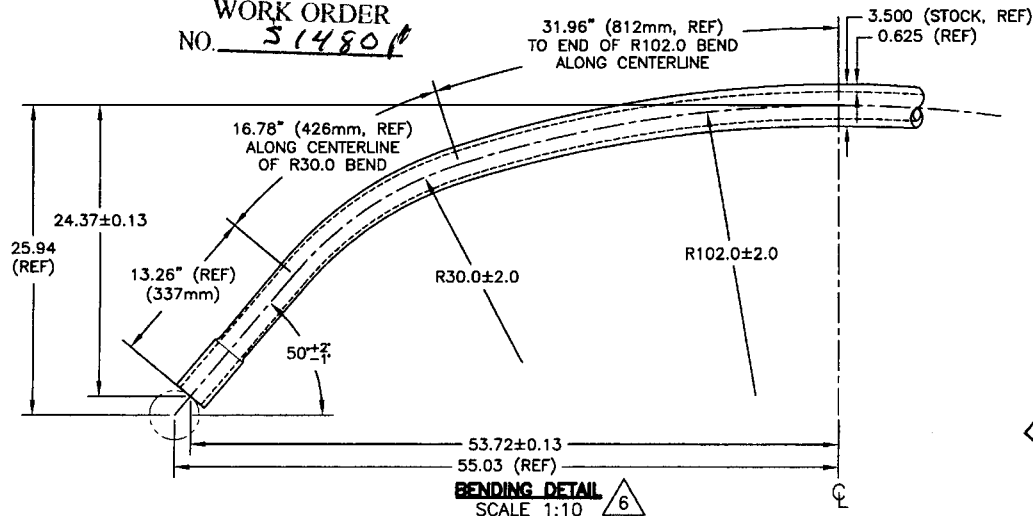
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.09±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

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WITHOUT NOTICE  
WORK ORDER  
NO. **51480**



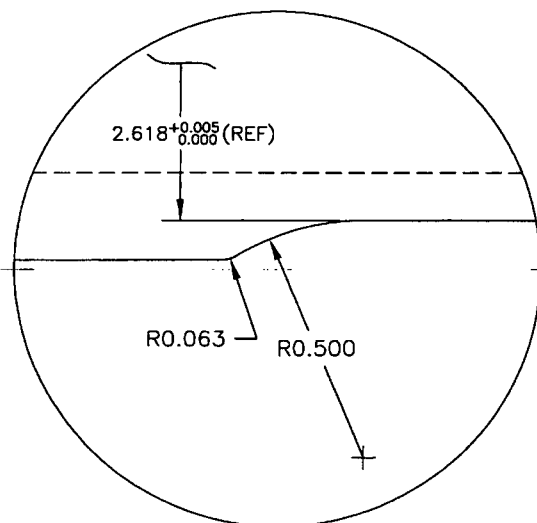
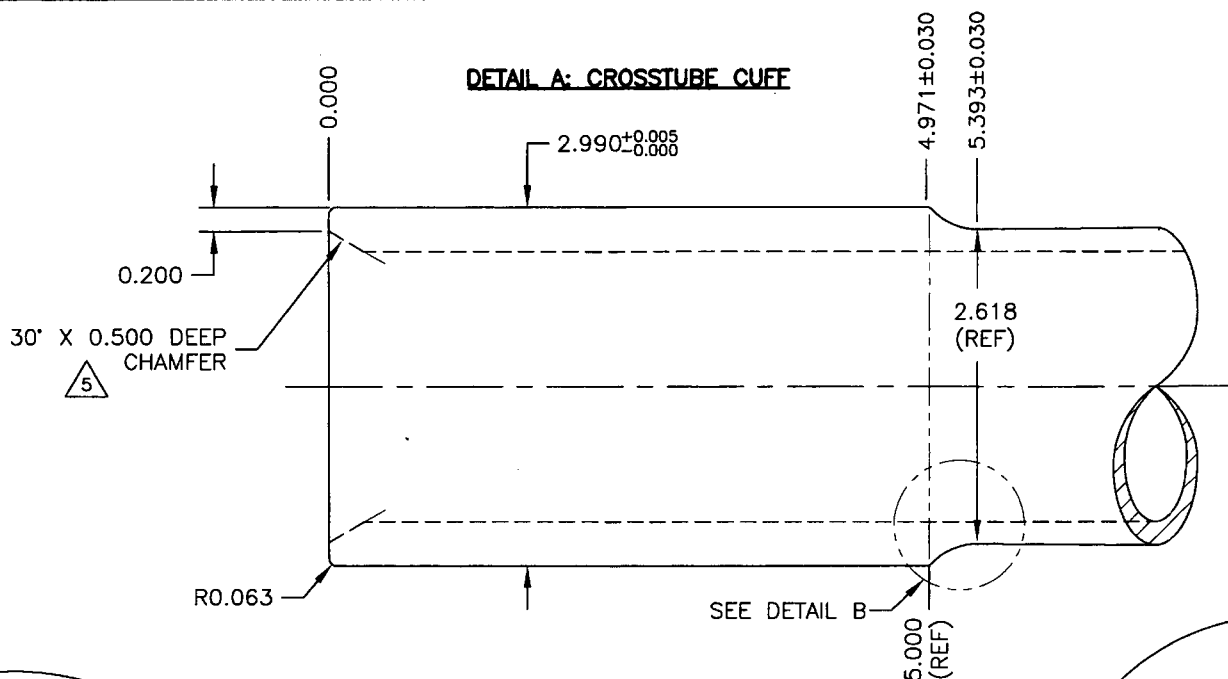
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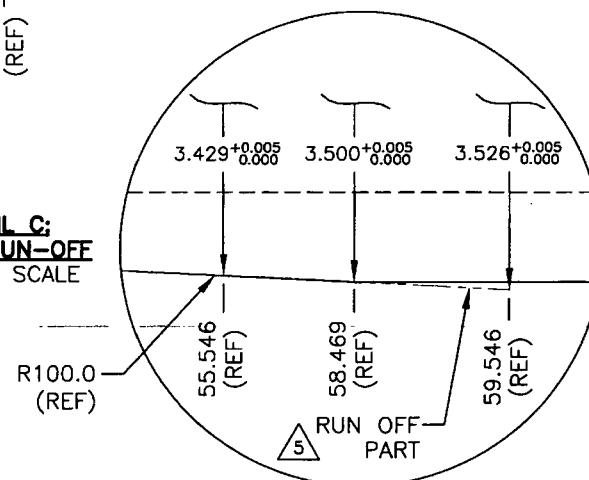
DESIGN	PH	DRAWN BY	PH	<b>DART</b>	DART AEROSPACE LTD. WILKESBURY, ONTARIO, CANADA
CHECKED	GP	APPROVED	PH	DRAWING NO. D412-664-243	REV. D
DATE	07.03.09	TITLE	CROSSTUBE ASSEMBLY (412 HI AFT)	SHEET 2 OF 3	SCALE 1:10

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WORK ORDER  
NO. 51480

RELEASED  
07-04-244P  
PER ECN 887



**DETAIL C:  
TAPER RUN-OFF**  
NOT TO SCALE



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DESIGN PH	DRAWN BY PH	<b>DART</b>	DART AEROSPACE LTD. BARKSBERY, ONTARIO, CANADA
CHECKED JA	APPROVED [Signature]	DRAWING NO. D412-664-243	REV. D SHEET 3 OF 3
DATE 07.03.09	TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE 1:1	